

ROUNDING AND TRUNKATING CONVENTIONS:

From AMTIC VERSION of QA Handbook Appendix D. (Revisions approved by National Strategy Workshop Group) from SYSTEMATIC CRITERIA

Requirement	Frequency	Acceptance criteria	Information/Action
O3: Standard Reporting Units	All data	ppm (final units in AQS)	1, 2 and 3) 40 CFR Part 50 App I sec 2.1.1
O3: Rounding convention for data reported to AQS	All data	3 places after decimal with digits to right truncated	1, 2 and 3) 40 CFR Part 50 App I sec 2.1.1
CO: Standard Reporting Units	All data	ppm (final units in AQS)	1, 2 and 3)) 40 CFR Part 50.8 (a)
CO: Rounding convention for data reported to AQS	All data	1 decimal place	1, 2 and 3) 40 CFR Part 50.8 (d) (for averaging values for comparison to NAAQS not for reporting individual hourly values.)
SO2: Standard Reporting Units	All data	ppm (final units in AQS)	1, 2 and 3) 40 CFR Part 50 App T Sec 2 (c)
SO2: Rounding convention for data reported to AQS	All data	1 place after decimal with digits to right truncated	1, 2 and 3) 40 CFR Part 50 App T Sec 2 (c)
NO2: Standard Reporting Units	All data	ppm (final units in AQS)	1,2 and 3) 40 CFR Part 50 App S Sec 2 (c)
NO2: Rounding convention for data reported to AQS	All data	1 place after decimal with digits to right truncated	1, 2 and 3) 40 CFR Part 50 App S Sec 4.2 (a)
PM Low Volume Reporting Units	All filters	µg/m3 at ambient temp/pressure (PM2.5)	1. 2 and 3) 40 CFR Part 50 App N Sec 3.0 (b)
PM Low Volume Rounding convention for data reported to AQS	All filters	to one decimal place, with additional digits to the right being truncated	1. 2 and 3) 40 CFR Part 50 App N Sec 3.0 (b)

Below are the cited references...with rounding and truncating regulations highlighted.

APPENDIX I TO PART 50—INTERPRETATION OF THE 8-HOUR PRIMARY AND SECONDARY NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OZONE

1. General.

This appendix explains the data handling conventions and computations necessary for determining whether the national 8-hour primary and secondary ambient air quality standards for ozone specified in § 50.10 are met at an ambient ozone air quality monitoring site. Ozone is measured in the ambient air by a reference method based on appendix D of this part. Data reporting, data handling, and computation procedures to be used in making comparisons between reported ozone concentrations and the level of the ozone standard are specified in the following sections. Whether to exclude, retain, or make adjustments to the data affected by stratospheric ozone intrusion or other natural events is subject to the approval of the appropriate Regional Administrator.

2. Primary and Secondary Ambient Air Quality Standards for Ozone.

2.1 Data Reporting and Handling Conventions for Ozone

2.1.1 Computing 8-hour averages. Hourly average concentrations shall be reported in parts per million (ppm) to the third decimal place, with additional digits to the right being truncated. Running 8-hour averages shall be computed from the hourly ozone concentration data for each hour of the year and the result shall be stored in the first, or start, hour of the 8-hour period. An 8-hour average shall be considered valid if at least 75% of the hourly averages for the 8-hour period are available. In the event that only 6 (or 7) hourly averages are available, the 8-hour average shall be computed on the basis of the hours available using 6 (or 7) as the divisor. (8-hour periods with three or more missing hours shall not be ignored if, after substituting one-half the minimum detectable limit for the missing hourly concentrations, the 8-hour average concentration is greater than the level of the standard.) The computed 8-hour average ozone concentrations shall be reported to three decimal places (the insignificant digits to the right of the third decimal place are truncated, consistent with the data handling procedures for the reported data.)

2.1.2 Daily maximum 8-hour average concentrations. (a) There are 24 possible running 8-hour average ozone concentrations for each calendar day during the ozone monitoring season. (Ozone monitoring seasons vary by geographic location as designated in part 58, appendix D to this chapter.) The daily maximum 8-hour concentration for a given calendar day is the highest of the 24 possible 8-hour average concentrations computed for that day. This process is repeated, yielding a daily maximum 8-hour average ozone concentration for each calendar day with ambient ozone monitoring data. Because the 8-hour averages are recorded in the start hour, the daily maximum 8-hour concentrations from two consecutive days may have some hourly concentrations in common. Generally, overlapping daily maximum 8-hour averages are not likely, except in those non-urban monitoring locations with less pronounced diurnal variation in hourly concentrations.

(b) An ozone monitoring day shall be counted as a valid day if valid 8-hour averages are available for at least 75% of possible hours in the day (*i.e.*, at least 18 of the 24 averages). In the event that less than 75% of the 8-hour averages are available, a day shall also be counted as a valid day if the daily maximum 8-hour average concentration for that day is greater than the level of the ambient standard.

2.2 Primary and Secondary Standard-related Summary Statistic. The standard-related summary statistic is the annual fourth-highest daily maximum 8-hour ozone concentration, expressed in parts per million, averaged over three years. The 3-year average shall be computed using the three most recent, consecutive calendar years of monitoring data meeting the data completeness requirements described in this appendix. The computed 3-year average of the annual fourth-highest daily maximum 8-hour average

ozone concentrations shall be expressed to three decimal places (the remaining digits to the right are truncated.)

2.3 Comparisons with the Primary and Secondary Ozone Standards. (a) The primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm. The number of significant figures in the level of the standard dictates the rounding convention for comparing the computed 3-year average annual fourth-highest daily maximum 8-hour average ozone concentration with the level of the standard. The third decimal place of the computed value is rounded, with values equal to or greater than 5 rounding up. Thus, a computed 3-year average ozone concentration of 0.085 ppm is the smallest value that is greater than 0.08 ppm.

§50.8 National primary ambient air quality standards for carbon monoxide.

(a) The national primary ambient air quality standards for carbon monoxide are:

(1) 9 parts per million (10 milligrams per cubic meter) for an 8-hour average concentration not to be exceeded more than once per year and

(2) 35 parts per million (40 milligrams per cubic meter) for a 1-hour average concentration not to be exceeded more than once per year.

(b) The levels of carbon monoxide in the ambient air shall be measured by:

(1) A reference method based on appendix C and designated in accordance with part 53 of this chapter, or

(2) An equivalent method designated in accordance with part 53 of this chapter.

(c) An 8-hour average shall be considered valid if at least 75 percent of the hourly average for the 8-hour period are available. In the event that only six (or seven) hourly averages are available, the 8-hour average shall be computed on the basis of the hours available using six (or seven) as the divisor.

(d) When summarizing data for comparison[sic] with the standards, averages shall be stated to one decimal place. Comparison of the data with the levels of the standards in parts per million shall be made in terms of integers with fractional parts of 0.5 or greater rounding up.

[50 FR 37501, Sept. 13, 1985]

APPENDIX T TO PART 50—INTERPRETATION OF THE PRIMARY NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OXIDES OF SULFUR (SULFUR DIOXIDE)

2. REQUIREMENTS FOR DATA USED FOR COMPARISONS WITH THE SO₂ NAAQS AND DATA REPORTING CONSIDERATIONS

(a) All valid FRM/FEM SO₂ hourly data required to be submitted to EPA's Air Quality System (AQS), or otherwise available to EPA, meeting the requirements of part 58 of this chapter including appendices A, C, and E shall be used in design value calculations. Multi-hour average concentration values collected by wet chemistry methods shall not be used.

(b) Data from two or more monitors from the same year at the same site reported to EPA under distinct Pollutant Occurrence Codes shall not be combined in an attempt to meet data completeness requirements. The Administrator will combine annual 99th percentile daily maximum concentration values from different monitors in different years, selected as described here, for the purpose of developing a valid 1-hour primary standard design value. If more than one of the monitors meets the completeness requirement for all four quarters of a year, the steps specified in section 5(a) of this appendix shall be applied to the data from the monitor with the highest average of the four quarterly completeness values to derive a valid annual 99th percentile daily maximum concentration. If no monitor is complete for all four quarters in a year, the steps specified in section 3(c) and 5(a) of this appendix shall be applied to the data from the monitor with the highest average of the four quarterly completeness values in an attempt to derive a valid annual 99th percentile daily maximum concentration. This paragraph does not prohibit a monitoring agency from making a local designation of one physical monitor as the primary monitor for a Pollutant Occurrence Code and substituting the 1-hour data from a second physical monitor whenever a valid concentration value is not obtained from the primary monitor; if a monitoring agency substitutes data in this manner, each substituted value must be accompanied by an AQS qualifier code indicating that substitution with a value from a second physical monitor has taken place.

(c) Hourly SO₂ measurement data shall be reported to AQS in units of parts per billion (ppb), to at most one place after the decimal, with additional digits to the right being truncated with no further rounding.

4. ROUNDING CONVENTIONS FOR THE 1-HOUR PRIMARY SO₂ NAAQS (a) Hourly SO₂ measurement data shall be reported to AQS in units of parts per billion (ppb), to at most one place after the decimal, with additional digits to the right being truncated with no further rounding. (b) Daily maximum 1-hour values and therefore the annual 99th percentile of those daily values are not rounded. (c) The 1-hour primary standard design value is calculated pursuant to section 5 and then rounded to the nearest whole number or 1 ppb (decimals 0.5 and greater are rounded up to the nearest whole number, and any decimal lower than 0.5 is rounded down to the nearest whole number).

APPENDIX S TO PART 50—INTERPRETATION OF THE PRIMARY NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OXIDES OF NITROGEN (NITROGEN DIOXIDE)

2. REQUIREMENTS FOR DATA USED FOR COMPARISONS WITH THE NO₂ NAAQS AND DATA REPORTING CONSIDERATIONS

(a) All valid FRM/FEM NO₂ hourly data required to be submitted to EPA's Air Quality System (AQS), or otherwise available to EPA, meeting the requirements of part 58 of this chapter including appendices A, C, and E shall be used in design value calculations. Multi-hour average concentration values collected by wet chemistry methods shall not be used.

(b) When two or more NO₂ monitors are operated at a site, the State may in advance designate one of them as the primary monitor. If the State has not made this designation, the Administrator will make the designation, either in advance or retrospectively. Design values will be developed using only the data from the primary monitor, if this results in a valid design value. If data from the primary monitor do not allow the development of a valid design value, data solely from the other monitor(s) will be used in turn to develop a valid design value, if this results in a valid design value. If there are three or more monitors, the order for such comparison of the other monitors will be determined by the Administrator. The Administrator may combine data from different monitors in different years for the purpose of developing a valid 1-hour primary standard design value, if a valid design value cannot be developed solely with the data from a single monitor. However, data from two or more monitors in the same year at the same site

will not be combined in an attempt to meet data completeness requirements, except if one monitor has physically replaced another instrument permanently, in which case the two instruments will be considered to be the same monitor, or if the State has switched the designation of the primary monitor from one instrument to another during the year.

(c) Hourly NO_x measurement data shall be reported to AQS in units of parts per billion (ppb), to at most one place after the decimal, with additional digits to the right being truncated with no further rounding.

4. ROUNDING CONVENTIONS

4.1 *Rounding Conventions for the Annual Primary NO_x NAAQS*

(a) Hourly NO_x measurement data shall be reported to AQS in units of parts per billion (ppb), to at most one place after the decimal, with additional digits to the right being truncated with no further rounding.

(b) The annual primary standard design value is calculated pursuant to section 5.1 and then rounded to the nearest whole number or 1 ppb (decimals 0.5 and greater are rounded up to the nearest whole number, and any decimal lower than 0.5 is rounded down to the nearest whole number).

4.2 *Rounding Conventions for the 1-hour Primary NO_x NAAQS*

(a) Hourly NO_x measurement data shall be reported to AQS in units of parts per billion (ppb), to at most one place after the decimal, with additional digits to the right being truncated with no further rounding.

(b) Daily maximum 1-hour values are not rounded.

(c) The 1-hour primary standard design value is calculated pursuant to section 5.2 and then rounded to the nearest whole number or 1 ppb (decimals 0.5 and greater are rounded up to the nearest whole number, and any decimal lower than 0.5 is rounded down to the nearest whole number).

APPENDIX N TO PART 50—INTERPRETATION OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PM_{2.5}

3.0 Requirements for Data Used for Comparisons With the PM_{2.5} NAAQS and Data Reporting Considerations. (a) Except as otherwise provided in this appendix, only valid FRM/FEM/ARM PM_{2.5} data required to be submitted to EPA's Air Quality System (AQS) shall be used in the design value calculations. (b) PM_{2.5} measurement data (typically hourly for continuous instruments and daily for filter-based instruments) shall be reported to AQS in micrograms per cubic meter (µg/m³) to one decimal place, with additional digits to the right being truncated. (c) Block 24-hour averages shall be computed from available hourly PM_{2.5} concentration data for each corresponding day of the year and the result shall be stored in the first, or start, hour (i.e., midnight, hour '0') of the 24-hour period. A 24-hour average shall be considered valid if at least 75 percent (i.e., 18) of the hourly averages for the 24-hour period are available. In the event that less than all 24 hourly averages are available (i.e., less than 24, but at least 18), the 24-hour average shall be computed on the basis of the hours available using the number of available hours as the divisor (e.g., 19). 24-hour periods with seven or more missing hours shall be considered valid if, after substituting zero for all missing hourly concentrations, the 24-hour average concentration is greater than the level of the standard. The computed 24-hour average PM_{2.5} concentrations shall be reported to one decimal place (the additional digits to the right of the first decimal place are truncated, consistent with the data handling procedures for the reported data).

4.3 Rounding Conventions. For the purposes of comparing calculated values to the applicable level of the standard, it is necessary to round the final results of the calculations described in sections 4.4 and 4.5 of this appendix. Results for all intermediate calculations shall not be rounded.

(a) Annual PM_{2.5} standard design values shall be rounded to the nearest 0.1 µg/m³ (decimals 0.05 and greater are rounded up to the next 0.1, and any decimal lower than 0.05 is rounded down to the nearest 0.1).

(b) 24-hour PM_{2.5} standard design values shall be rounded to the nearest 1 µg/m³ (decimals 0.5 and greater are rounded up to the nearest whole number, and any decimal lower than 0.5 is rounded down to the nearest whole number).